WINTER/SPRING FLOOD POTENTIAL OUTLOOK NATIONAL WEATHER SERVICE GREENVILLE-SPARTANBURG SC Issued Friday, January 05, 2018

... The first Winter/Spring Flood Potential Outlook for 2018 has analyzed mainstem river flood potential as BELOW NORMAL for the Piedmont and SLIGHTLY BELOW NORMAL to NEAR NORMAL for the Foothills and mountains of the western Carolinas and northeast Georgia...

ABOUT THIS PRODUCT... _____

Every two weeks from January through mid-March, NWS Greenville-Spartanburg (GSP) issues a Flood Potential Outlook for the entire service area (see county-to-region legend at the end of this outlook for a list of counties serviced by NWS GSP). These outlooks forecast the potential for runoff, small stream, and mainstem river flooding through late April, or the end of the winter recharge season. The outlook is prepared based on an assessment of several hydrometeorological factors, including recent and forecasted precipitation and observed soil moisture, groundwater levels, streamflows, reservoir levels, and recent flooding events.

This product is also located at:

http://weather.gov/gsp/floodoutlook

For additional hydrological and meteorological information please visit:

http://weather.gov/gsp/hydro

========== HISTORICALLY... ==========

The mainstem river flood season typically begins in late December. The quantity, frequency, magnitude, and significance of river flood events often increases through late winter with a peak in early to mid-March. While the mainstem river flood season typically ends by late April for the region, small stream flash flooding can occur year-round. The mainstem flood season began prematurely in October across the western North Carolina mountains; however, November and December were abnormally dry and streamflows have decreased considerably as a result. Therefore, it will take more frequent and more significant precipitation over the next two months to increase the chance of mainstem flood occurrence across the region.

14-DAY OBSERVED PRECIPITATION and FLOODING...

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2018 Winter/Spring Flood Outlook #1

| REGION | | | MAINSTEM FLOODING | SMALL STREAM FLOODING |
|---|---|-------------------------------|---|---|
| NC Piedmont NC Foothills NC Nrn Mnts NC Cntl Mnts NC Srn Mnts | 0.01-0.50 0.25-0.50 0.25-1.25 | 1- 25 15- 40 10- 50 | None NA None | None None |
| SC Mnts SC Foothills SC Piedmont | 0.01-0.75 | 1- 25 | None | None |
| GA NE Mnts/ Foothills | | | | |
| GA Piedmont | 0.10-0.50 | 10- 25 | None | None |
| | | | | |
| ====================================== | | | | |
| ========= | | | | |
| | | | | |
| REGION | | | DAY SNOWFALL FORECAST | |
| | | (in) | (in) | |
| NC Piedmont NC Foothills NC Nrn Mnts NC Cntl Mnts NC Srn Mnts | None 0-1 0 None | None -0.05 None | None None 0-0.5 0-0.5 0-0.5 | |
| | | | | |
| SC Mnts SC Foothills | | | None None | |
| SC Piedmont | | None | None | |
| GA NE Mnts/ Foothills | None | None | None | |
| GA Piedmont | None | None | None | |
| | | | | |
| ======== | | ======= | ======== | ======== |
| | | | | D POTENTIAL |
| | | | | |
| REGION | PRECIP | NORMAL | | SMALL STREAM FLOOD PTNTL (1/5-15) |

2018 Winter/Spring Flood Outlook #1

| NC Piedmont NC Foothills NC Nrn Mnts NC Cntl Mnts NC Srn Mnts | 1.00-1.75 30-1 | 30 Zero 20 NA 40 Near Zero | Zero Slight Zero Near Zero Slight |
|---|--|---|--|
| SC Mnts SC Foothills SC Piedmont | • | 90 Zero | Near Zero Zero Zero |
| GA NE Mnts/ Foothills GA Piedmont | 1.00-2.00 35-10 0.50-1.25 20- | | Zero Zero |
| DEFINITIONS: | | | |
| Flood Potenti Categories: | Near Zero = Slight = Moderate = Likely = | = No flood potenti = Very low flood p = Isolated Minor F = Scattered Minor = Sct-Widespread M Iso Moderate Flo = Scattered Mod/Is Likely | otential looding Possible Flooding Possible inor Flooding Likely oding Psble |
| | IPITATION OUTLOOKS | | |
| REGION | 8-14 DAY PRECIP OUTLOOK | 15-30 DAY PRECIP OUTLOOK | FEB-MAR 2018 PRECIP OUTLOOK |
| NC Piedmont NC Foothills NC Nrn Mnts NC Cntl Mnts NC Srn Mnts | Slghtly Blw Nrml Slghtly Blw Nrml Slghtly Blw Nrml | | Near Normal |
| SC Mnts SC Foothills SC Piedmont | Slghtly Blw Nrml | Near Normal Near Normal Near Normal | Near Normal |
| GA NE Mnts/ Foothills | | Near Normal | |
| HYDROLOGIC SU | | | ====================================== |

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..IMPORTANT NOTES...
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It is very important to note that flash flooding and flooding of smaller tributaries is still very possible during periods of dry weather and/or drought. Several important and damaging flash floods were observed during previous drought periods. Residents are strongly encouraged to heed related flood advisories and warnings, even during significant drought.

The winter and early spring months are a critical time for the water system as widespread winter precipitation normally restores streamflows and reservoir levels following the spotty, convective nature of precipitation during the summer and the drier weeks of early fall. This recharge of the water system is critical for adequate water supply heading into the late spring and summer of 2017. When the winter begins in a significant drought, it takes a greater amount of precipitation to adequately complete this recharge.

..SOIL and CROP MOISTURE...

------ SOIL/CROP MOISTURE ESTIMATES ------

------ SOIL/CROP MOISTURE ESTIMATES ------

| REGION | 12/31 1/4 TOTAL^ COLUMN SOIL SOIL MOISTURE MOISTURE ANOMALY %ile~ (mm) (%) | FROM Oct 31 | |
|---|--|--|--|
| NC Foothills NC Nrn Mnts NC Cntl Mnts | + 50 to 0 Nrml | -20 to -40 Little Chg Little Chg | -1 - +1, Near Nrml -1 - +1, Near Nrml -1 - +1, Near Nrml |
| Foothills | - 25 to - 50 Nrml - 25 to -100 10-30 | _ | |
| GA NE Mnts/ Foothills GA Piedmont | | _ | |

DEFINITIONS:

EVAPOTRANSPIRATION = The loss of moisture from the soil to the atmosphere plus the loss of moisture from the soil to vegetation.

below-normal temperatures and above-normal precipitation mitigates soil-moisture deficits. However, heading into fall and winter, cooler temperatures and less-active or dormant vegetation reduce demands on the water system and while still important, the effects of above-normal temperatures and below-normal precipitation are lessened.

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*CROP MOISTURE = Depicts short-term (< 1 month) dryness or wetness impacting agriculture. Negative values indicate dryness, while positive values indicate wetness. The index is not a depicter of medium-range (i.e., 1-6 months) to long-range (i.e., >6 months) wetness or drought.

^TOTAL COLUMN

= Defined as a 2-meter depth (6.56ft) and derived from the North American Land Data Assimilation System (NLDAS) which is a joint modeling effort between the National Centers for Environmental Prediction and the National Aeronautics and Space Administration.

~PERCENTILES

= Derived from CPC's one-layer soil-moisture model which has a maximum soil column depth of 1.6m or 5.25 ft.

...GROUNDWATER*...

----- GROUNDWATER WELL MEASUREMENTS ------

----- Depth Below Ground Surface in Feet -----

| COUNTY | LOCATION | DEPTH* 1/4 (ft) | JAN** MEDIAN | CHANGE** SINCE 12/22 (ft) | *RECORD LOWEST LEVEL (ft) | and DATE |
|--|--------------------------------|---|---|------------------------------------|--|--|
| Burke Caldwell Catawba Gaston McDowell Union (NC) York | Oxford Resrch St Pasour Mtn | 20.28 41.17 45.12 29.21 39.35 | 21.03 39.40 38.60 28.46 39.11 | NA NA NA | 26.15, 42.09, 45.18, 31.89, 42.70, | 09/04/11 03/09/17 01/14/13 01/04/18 11/29/10 01/10/13 12/13/12 |
| COUNTY | LOCATION | DEPTH* 1/4 (ft) | CHANGE* SINCE 1/4 (ft) | %ile **** (1/4) | (ft) | DATE |
| Anderson | Williamston | 3.55 | NA | 10-25 | 5.98, | 06/25/02 |

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| Cherokee | Marble | 6.17 | | NA | <10th | 15.16, | 11/28/16 |
|--------------|------------------|-------|---|----|-------|--------|----------|
| Chester | Leeds Road | 89.00 | 1 | NA | 25-50 | 94.52, | 01/12/14 |
| Davie | Mocksville | 19.38 | 1 | NA | 10-25 | 23.32, | 08/24/02 |
| Haywood | near Cruso | 5.48 | 1 | NA | 25-50 | 6.96, | 09/12/02 |
| Iredell | Langtree | 27.93 | 1 | NA | < 1st | 33.03, | 11/02/17 |
| Oconee | Oconee Statn Rd | 30.15 | 1 | NA | 25th | 32.08, | 12/31/08 |
| Rowan | Barber | 7.36 | 1 | NA | 25-50 | 11.15, | 09/14/02 |
| Spartanburg | Croft State Park | 47.41 | | NA | 25-50 | 51.69, | 03/17/13 |
| Transylvania | Blantyre | 30.81 | | NA | 50-75 | 42.19, | 12/12/08 |
| Transylvania | Pisgah Forest | 14.91 | 1 | NA | 25-50 | 17.86, | 08/25/08 |
| White | Unicoi State Pk | 5.30 | 1 | NA | < 1st | 6.49, | 09/28/98 |

DEFINITIONS:

- * DEPTH = Note that groundwater is measured as depth below the surface, unlike streamflow and reservoir data which is the reverse or height above the surface. Therefore, the higher the depth value, the less the groundwater supply because the groundwater level is further from the surface.
- **MEDIAN = Current depth values that are larger than the monthly median can be loosely correlated to drier-than-normal conditions while current depth values that are smaller than the monthly median can be loosely correlated to wetter-than-normal conditions.
- ***CHANGE = A POSITIVE CHANGE means the groundwater depth has increased or is further from the surface. Therefore, a NEGATIVE CHANGE means the groundwater depth has decreased or is closer to the surface. In periods of drought, negative changes are ideal. However, positive changes are NORMAL during the late summer and early fall, as rainfall is typically isolated to scattered and less significant, causing losses to surface and subsurface water sources due to increased evapotranspiration, evaporation, and increased consumption, while negative changes are NORMAL during the late fall and winter, as widespread significant precipitation recharges surface and subsurface water sources and environmental demands are lower.

Note, however, that for many groundwater sites, the depth of the wells are very deep and there is a lag between significant rainfall and deep infiltration into subsurface water supplies. If the rainfall is not significant or occurring over a sustained period of time, the water may never reach the groundwater wells. Additionally, if the rainfall is significant but occurring quickly and only once during a period of several weeks, a shallower groundwater well may spike and then return to near pre-rainfall levels.

****PERCENTILE = The percentile (%ile) values can be interpreted as follows:

Less than 10th percentile - Well-Below Normal

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10th-25th percentile - Below Normal
25th-50th percentile - Slightly Below Normal/Near Normal
50th-75th percentile - Slightly Above Normal/Near Normal
75th-90th percentile - Above Normal
Greater than 90th percentile - Well-Above Normal
The percentile values are computed monthly. Therefore, percentiles
referenced in the chart above are for the month of January.
Groundwater well statistics change throughout the water year such
that the median monthly depth typically reaches a minimum in autumn
and a peak in late spring. This can result in a dramatic change
in the percentile of an observed depth from one month to the next,
even if the observed depth does not change significantly.
 ______
..STREAMFLOW*...
______
----- 28-DAY AVERAGE USGS STREAMFLOW PERCENTILES BY REGION ------
______
                  % OF %ILE CLASSIFICATION
REGION
               NORMAL
                 (1/4) (1/4) (1/4)

      NC Piedmont
      17- 66 | 7-30 | Below Normal

      NC Foothills
      40- 79 | 7-37 | Below Normal

      NC Nrn Mnts
      46- 72 | 13-31 | Below Normal

      NC Cntl Mnts
      49- 85 | 10-52 | Slightly-Below Normal

      NC Srn Mnts
      32- 75 | 8-37 | Below Normal

SC Mnts/ 29- 58 | 7-25 | Below Normal
   Foothills
                 3- 66 | 9-32 | Below Normal
SC Piedmont
GA NE Mnts/ 40-66 | 12-29 | Below Normal
  Foothills
GA Piedmont 38-41 | 9-18 | Below Normal
---- 28-DAY AVERAGE USGS STREAMFLOW PERCENTILES BY RIVER SYSTEM ----
______
                         % OF %ILE CLASSIFICATION
                      NORMAL
(1/4) (1/4)
RIVER BASIN
                                                  (1/4)
Broad (GA)
                      38- 41 | 9-16 | Below Normal
Broad (NC/SC)/Pacolet 25-77 | 7-37 | Below Normal
                       3- 79 | 4-37 | Near Normal (Upper)/
Catawba
                                         Well-Below Normal (Lower)
Enoree/Tyger 37-66 | 10-32 | Slightly Below Normal
```

| French Broad Nantahala/Tucka Little Tennesse | asegee/ | 53-115 1 32- 74 | | | | |
|--|----------------------------------|--|------------------------------|----------------------------------|----------------------------|------------------------|
| Pigeon Rocky/Yadkin Reedy/Saluda Tallulah/Chatto Toxaway/Keowee, Savannah | ooga | 49- 85 1 17- 66 29- 58 40- 66 1 22- 49 1 | 6-40 1 9-34 1 2-29 | Below No Below No Sliahtly | rmal rmal Below No | |
| DEETNIETONO | | | | | | |
| DEFINITIONS | | | | | | |
| f: ar | i.e., ri ositivel rom thos | vers with y and/or n e reservoi regulatio | reservo egative rs. Fo | irs) may ly by th r a list | be influe control of mains | |
| | _ | | | | | |
| RESERVOIRS | • | | | | | |
| | - | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | - 10 | |
| | | AVG* ELEV | | | 1/4 | |
| RESERVOIR | NWS TE | | 12/22 | ЕLEV 1 / Д | ELEV- | MIN DGT ELEV* STGE |
| KESEKVOIK | NWO IL | (ft) | | (ft) | (ft) | (ft) |
| | | , , | , , | , , | , , | , , |
| BROAD SYSTEM | | | | | | |
| Summit | (None) | 07 2 1 | NT 7\ | 1 07 5 | 1 -0 20 | 85.0 NA |
| Gaston Shoals | | | | 97.5 | | 98.0 NA |
| Ninety-Nine Isl | | | | | | 98.0 NA |
| CATAWBA SYSTEM | | | | | age 112% | of Target) |
| | | | | | | _ |
| James | (BRWN7 | | | | +0.62 | |
| Rhodhiss | |) 96.36 | | | | |
| Hickory | |) 97.03 | | | | |
| Lookout Shoals | | | | | | |
| Norman | |) 96.60 | | | | |
| Mountain Island | a (MOUN) |) 9/.15 | 96.92 | 96.0 | +1.15 | 94.3 0 |
| Wylie | |) 97.55) 98.02 | 97.50 | 97.0 | 1 +0.55 | 94.0 0 |
| Fishing Creek Great Falls | | | | | | 95.0 0 95.0 0 |
| Cedar Creek | | | | | | 96.0 0 |
| 22001 | , | , 21.00 | | , ,,,,,, | , | , 2220 0 |
| NANTAHALA/LITTI | LE TENNE | SSEE/TUCKA | SEGEE S | YSTEM | | |
| Tanasee Creek | (EFKN7) | 85.37 | 86.01 | 85.0 | +0.37 | 83.0 ND |

| Bear Creek | (BCDN7) | 95.13 | | 94.78 | | 93.0 | +2.13 | | 91.0 | ND |
|--------------|---------|---------|---|--------|---|-------|-------|----|-------|----|
| Cedar Cliff | (ICCN7) | 98.20 | | 97.50 | | 98.0 | +0.20 | | 96.0 | 0 |
| Glenville | (THPN7) | 87.36 | | 86.72 | | 90.0 | -2.64 | | 85.0 | ND |
| Wolf Creek | (WCDN7) | 84.85 | | 85.50 | | 85.0 | -0.15 | | 83.0 | ND |
| Nantahala | (NANN7) | 77.29 | | 77.26 | | 78.7 | -1.41 | | 73.4 | ND |
| Queens Creek | (QCDN7) | 89.27 | | 90.13 | | 86.8 | +2.47 | | 85.8 | ND |
| Fontana | (FONN7) | 1651.29 | 1 | 652.45 | 1 | 653.0 | -1.71 | 16 | 648.5 | NA |

SAVANNAH SYSTEM (As of 1/2, Total Reservoir Storage 74% of Target)

| Jocassee | (JCSS1) | 91.52 | 91.95 | NA | NA | 77.0 | 2 | 2 |
|----------|---------|--------|--------|--------|-------|---------|---|---|
| Keowee | (KEOS1) | 98.25 | 97.80 | NA | NA | 94.6 | 2 | 2 |
| Hartwell | (HRTG1) | 650.90 | 651.60 | 656.16 | -4.56 | 625.0 | 2 | 2 |
| Russell | (RBDS1) | 472.68 | 473.33 | 1475.0 | -2.32 | 470.0 I | 2 | 2 |

PROJECTIONS...

LAKE HARTWELL...assuming net inflows increase to 50% of normal then hold steady over the next two months, the pool elevation is projected to increase 1-3 feet through mid-March, but there will only be a slight decrease in the storage deficit as the guide curve increases at a similar rate in order to build storage for summer.

FONTANA LAKE... projected to remain near the flood guide curve through the winter if near-normal rainfall occurs.

DEFINITIONS...

*AVG ELEV = Reporting the daily average elevation factors in the fluctuations in pool elevation due to scheduled discharges and/or power generation.

MINIMUM ELEVATION

= The minimal elevation is the lowest elevation that the pool can be while meeting local community and river system needs. Drought release reduction plans may begin above the minimal elevation. For Lake Hartwell and Richard B. Russell Lake, the minimal elevation marks the bottom of conservation storage or the top of the inactive pool. Drought release reduction plans begin at or above the minimal elevation, at 656.0 feet at Lake Hartwell and at 470.0 feet for Richard B. Russell Lake.

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ND
           = No Drought
           = Not Applicable
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LONG-TERM FLOOD OUTLOOK... _____

Therefore, given current antecedent conditions and long-range

precipitation guidance, the long-term flood outlook through the end of April 2017 is as follows...

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| REGION | RUNOFF POTENTIAL | SMALL STREAMS FLOOD POTENTIAL | | |
|-----------------------------|---|---|---|--|
| NC Nrn Mnts NC Cntl Mnts | Near Normal Near Normal | Slight Blw Nrml Slight Blw Nrml Near Normal | 1 | Well-Below Normal Slightly-Below Nrml NO MAINSTEMS Slightly-Below Nrml Near Normal |
| SC Foothills | Near Normal Near Normal Slight Blw Nrml | Slight Blw Nrml | Ì | Slightly-Below Nrml |
| GA NE Mnts/ Foothills | Near Normal | Near Normal | I | Slightly-Below Nrml |
| GA Piedmont | Slight Blw Nrml | Below Normal | I | Below Normal |
| | | | | |

ACKNOWLEDGMENTS...

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The precipitation analysis is derived from quality-controlled gridded precipitation estimates produced at the Lower Mississippi River Forecast Center (LMRFC) and the Southeast River Forecast Center (SERFC).

The 1-10 day future precipitation is derived from guidance produced by NWS Greenville-Spartanburg.

The long-term precipitation outlooks are derived from guidance produced at the Climate Prediction Center (CPC).

Streamflow information is courtesy of the United States Geological Survey (USGS).

Reservoir information is courtesy of Duke Energy...Georgia Power... and the US Army Corps of Engineers (USACE).

The general outlook is produced in collaboration with the LMRFC and the SERFC.

NEXT ISSUANCE DATE...

The second flood outlook will be issued by Friday, January 19th, 2018.

ADDITIONAL RESOURCES...

For the latest LEVELS of streams and mainstem rivers across the region please visit and bookmark:

http://water.weather.gov/ahps2/ area.php?wfo=gsp&hydro type=0&hsa type=1

For the latest status of DROUGHT conditions across the region please visit and bookmark:

http://droughtmonitor.unl.edu

______ COUNTY TO REGION LEGEND...

..GEORGIA...

COUNTY REGION

Elbert GA Piedmont
Franklin GA Piedmont
Habersham GA NE Mountains/Foothills
Hart GA Piedmont
Rabun GA NE Mountains/Foothills
Stephens GA NE Mountains/Foothills

_____ ..NORTH CAROLINA...

COUNTY REGION (SUBREGION)

Alexander
Avery
NC Northern Mountains
Buncombe
NC Central Mountains
Burke
NC Foothills (Northern)
Cabarrus
Caldwell
NC Foothills (Northern)
Catawba
NC Foothills (Northern)
Catawba
NC Foothills (Northern)
Cleveland
NC Foothills (Northern)
Cleveland
NC Piedmont (Southern)
Davie
NC Piedmont (Northwest)
Gaston
NC Piedmont (Southern)
Graham
NC Central Mountains
Haywood
NC Central Mountains
Henderson
NC Southern Mountains
Iredell
NC Piedmont (Northwest)
Jackson North
NC Central Mountains Jackson North NC Central Mountains Jackson South NC Southern Mountains Lincoln NC Piedmont (Southern)
Macon NC Southern Mountains
Madison NC Central Mountains
McDowell NC Foothills (Northern)
Mecklenburg NC Piedmont (Southern)
Mitchell NC Northern Mountains
Polk NC Foothills (Southern)

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| Rowan | NC | Piedmont (Northwest) |
|--------------|----|----------------------|
| Rutherford | NC | Foothills (Southern) |
| Swain | NC | Central Mountains |
| Transylvania | NC | Southern Mountains |
| Union | NC | Piedmont (Southern) |
| Yancey | NC | Northern Mountains |

... SOUTH CAROLINA... _____

COUNTY REGION (SUBREGION) Abbeville SC Piedmont (Lower)
Anderson SC Piedmont (Northern)
Cherokee SC Piedmont (Northern)
Chester SC Piedmont (Eastern)
Greenville SC Mountains/Foothills
Greenwood SC Piedmont (Lower)
Laurens SC Piedmont (Lower)
Oconee SC Mountains/Foothills
Pickens SC Mountains/Foothills
Spartanburg SC Mountains/Foothills
Union SC Piedmont (Eastern)
York SC Piedmont (Eastern)

_____ MAINSTEM RIVER LEGEND... ______

REGION RIVER

NC Piedmont Catawba (Heavily Regulated)

South Fork Catawba (Slightly Regulated)

Rocky
Yadkin (Regulated)
Broad (Regulated)
Catawba (Regulated)
NONE NC Foothills Broad

NC Nrn Mnts NONE

NC Cntl Mnts French Broad (Slightly Regulated) Little Tennessee (Heavily Regulated)

Nantahala (Heavily Regulated)
Oconaluftee (Slightly Regulated)

Pigeon

Tuckasegee (Heavily Regulated)
NC Srn Mnts French Broad (Slightly Regulated)

Little Tennessee (Heavily Regulated)

Nantahala (Regulated)
Tuckasegee (Regulated)

NO MAINSTEM RIVERS SC Mnts

SC Foothills Chatooga

Enoree

Pacolet (Slightly Regulated)
Reedy (Slightly Regulated)
Saluda (Regulated)
Savannah (Heavily Regulated)
Toxaway/Seneca (Heavily Regulated)

2018 Winter/Spring Flood Outlook #1

Tyger

SC Piedmont Broad

Broad (Regulated)
Pacolet (Slightly Regulated)
Reedy (Slightly Regulated)
Saluda (Regulated)
Savannah (Heavily Regulated)

Tyger

GA NE Mnts/ Chatooga

Foothills Tallulah/Tugaloo (Heavily Regulated)

GA Piedmont Broad

Savannah (Heavily Regulated)

______ OUESTIONS or COMMENTS...

This product has undergone several revisions and enhancements over the past couple of years. Additional enhancements are planned for future flood outlooks. Your feedback and recommendations are encouraged in order to ensure this product meets user needs. Please direct feedback, recommendations, questions, and comments to:

National Weather Service Weather Forecast Office - Greenville-Spartanburg 1549 GSP Drive Greer SC 29651 Phone 864-848-9970 x234 joshua.palmer@noaa.gov

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JMP